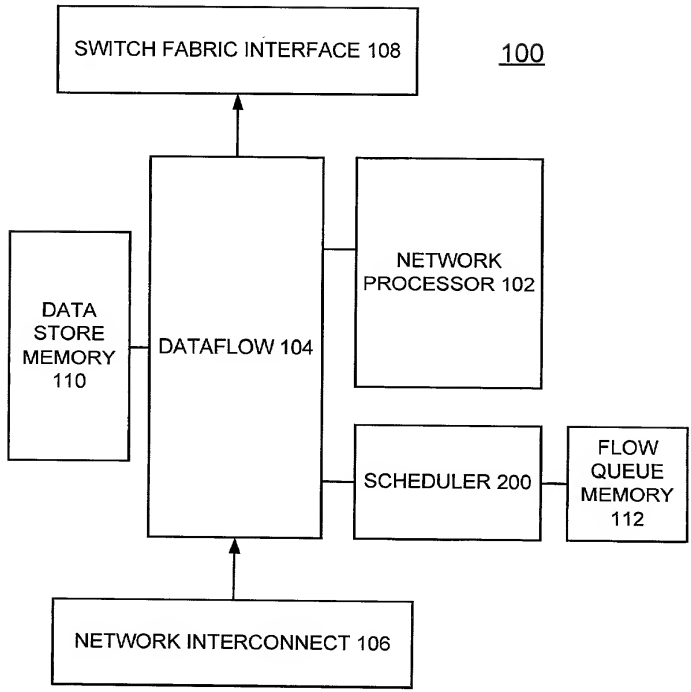
SWITCH FABRIC INTERFACE 108
100
DATA STORE MEMORY 110
DATAFLOW 104
NETWORK PROCESSOR 102
SCHEDULER 200
FLOW QUEUE MEMORY 112
NETWORK INTERCONNECT 106

FIG. 1A

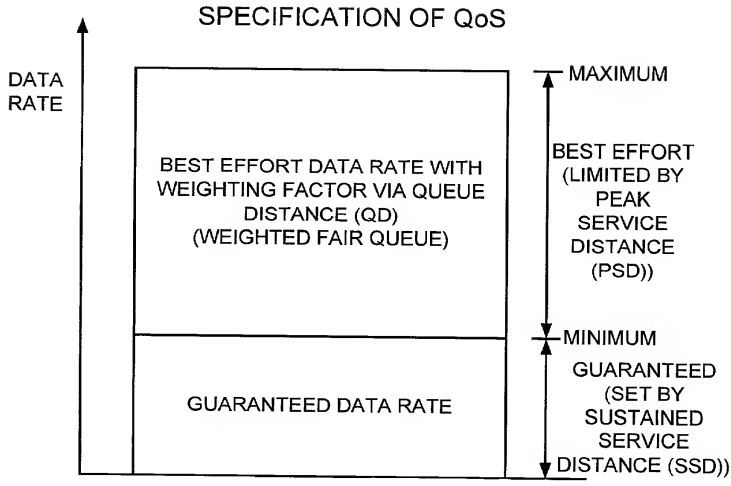
SPECIFICATION OF QoS
DATA RATE
BEST EFFORT DATA RATE WITH WEIGHTING FACTOR VIA QUEUE DISTANCE (QD) (WEIGHTED FAIR QUEUE)
GUARANTEED DATA RATE
MAXIMUM
BEST EFFORT (LIMITED BY PEAK SERVICE DISTANCE (PSD))
MINIMUM
GUARANTEED (SET BY SUSTAINED SERVICE DISTANCE (SSD))

FIG. 1B

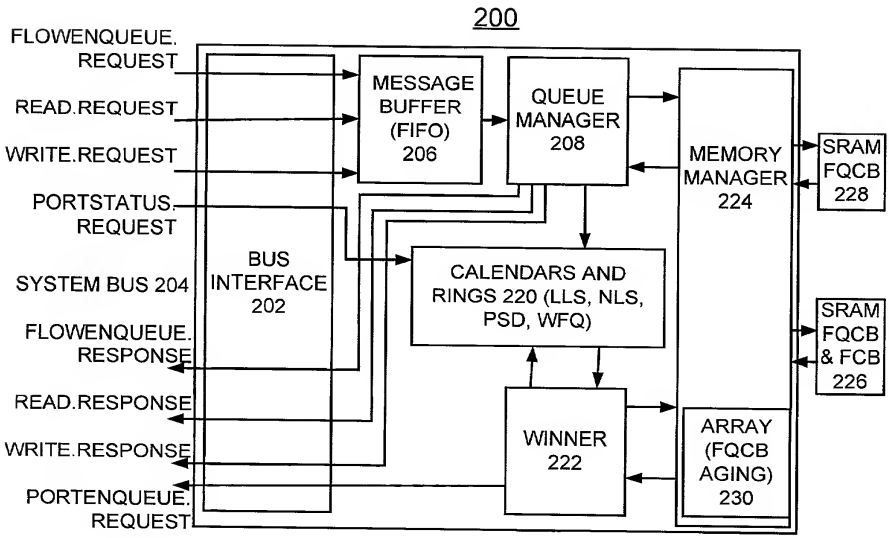
200
FLOWENQUEUE. REQUEST
READ.REQUEST
WRITE.REQUEST
PORTSTATUS. REQUEST
SYSTEM BUS 204
FLOWENQUEUE. RESPONSE
READ.RESPONSE
WRITE.RESPONSE
PORTENQUEUE. REQUEST
BUS INTERFACE 202
MESSAGE BUFFER (FIFO) 206
QUEUE MANAGER 208
CALENDARS AND RINGS 220 (LLS, NLS, PSD, WFQ)
WINNER 222
MEMORY MANAGER 224
ARRAY (FQCB AGING) 230
SRAM FQCB 228
SRAM FQCB & FCB 226

FIG. 2

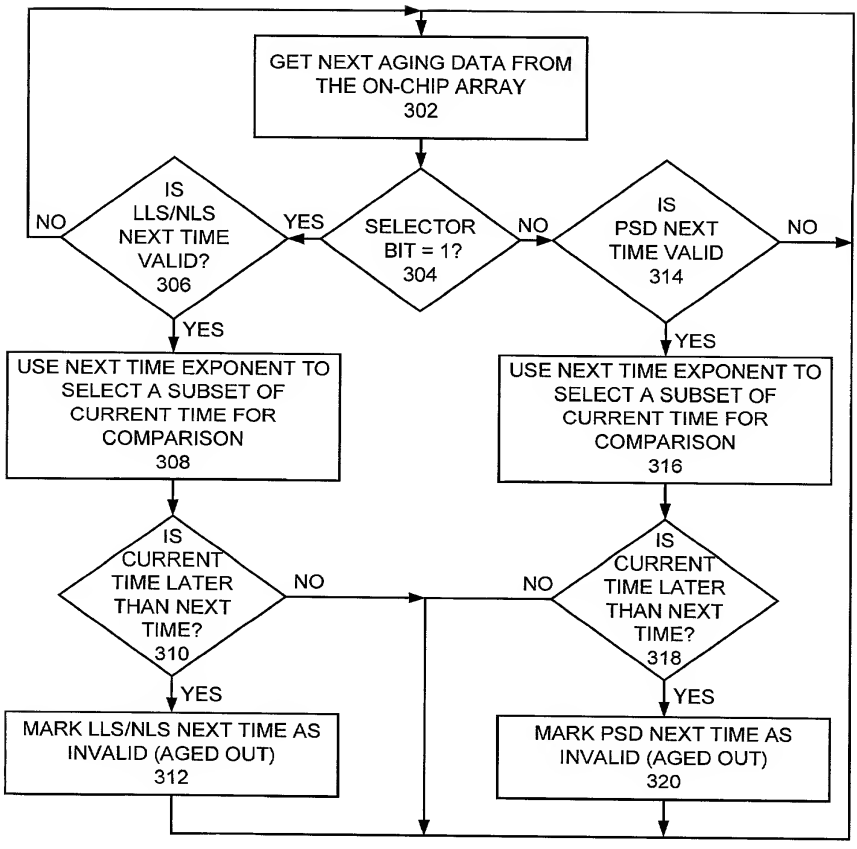
GET NEXT AGING DATA FROM THE ON-CHIP ARRAY 302
SELECTOR BIT = 1? 304
YES
NO
IS LLS/NLS NEXT TIME VALID? 306
NO
YES
USE NEXT TIME EXPONENT TO SELECT A SUBSET OF CURRENT TIME FOR COMPARISON 308
IS CURRENT TIME LATER THAN NEXT TIME? 310
NO
YES
MARK LLS/NLS NEXT TIME AS INVALID (AGED OUT) 312
IS PSD NEXT TIME VALID 314
NO
YES
USE NEXT TIME EXPONENT TO SELECT A SUBSET OF CURRENT TIME FOR COMPARISON 316
IS CURRENT TIME LATER THAN NEXT TIME? 318
NO
YES
MARK PSD NEXT TIME AS INVALID (AGED OUT) 320

FIG. 3

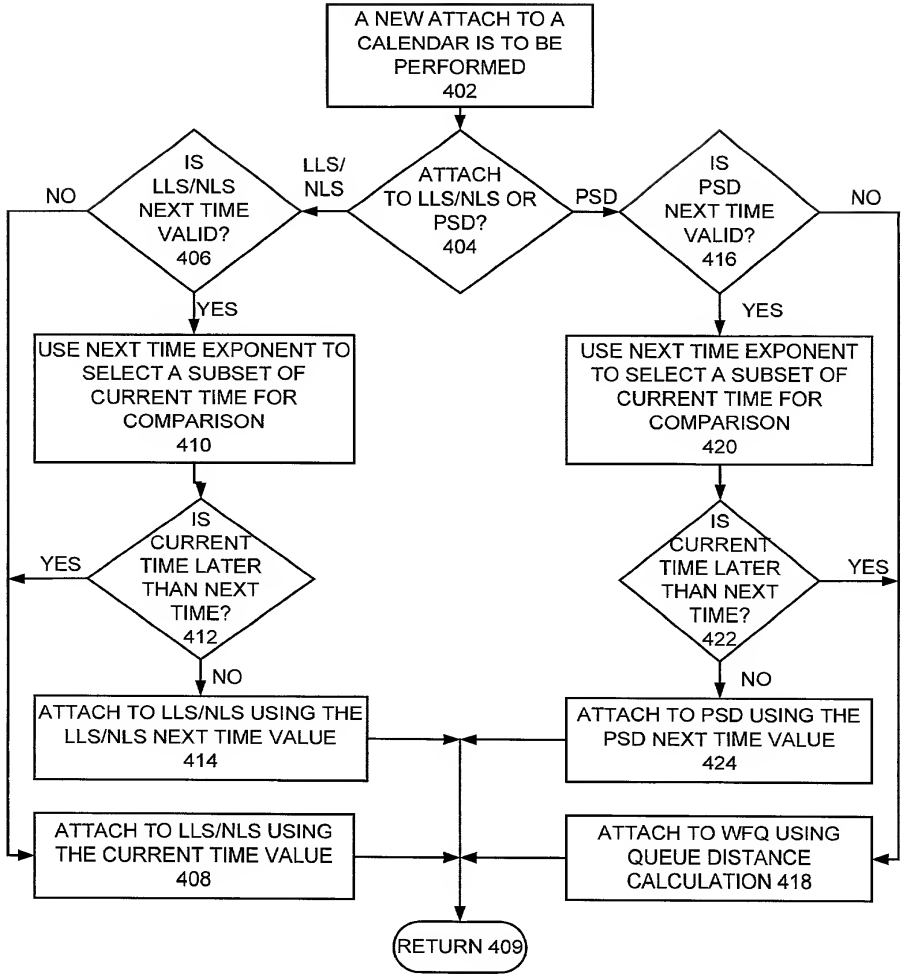
A NEW ATTACH TO A CALENDAR IS TO BE PERFORMED 402
ATTACH TO LLS/NLS OR PSD? 404
LLS/NLS
PSD
IS LLS/NLS NEXT TIME VALID? 406
NO
YES
IS PSD NEXT TIME VALID? 416
NO
YES
USE NEXT TIME EXPONENT TO SELECT A SUBSET OF CURRENT TIME FOR COMPARISON 410
USE NEXT TIME EXPONENT TO SELECT A SUBSET OF CURRENT TIME FOR COMPARISON 420
IS CURRENT TIME LATER THAN NEXT TIME? 412
YES
NO
IS CURRENT TIME LATER THAN NEXT TIME? 422
YES
NO
ATTACH TO LLS/NLS USING THE LLS/NLS NEXT TIME VALUE 414
ATTACH TO PSD USING THE PSD NEXT TIME VALUE 424
ATTACH TO LLS/NLS USING THE CURRENT TIME VALUE 408
ATTACH TO WFQ USING QUEUE DISTANCE CALCULATION 418
RETURN 409

FIG. 4

FIG. 5A

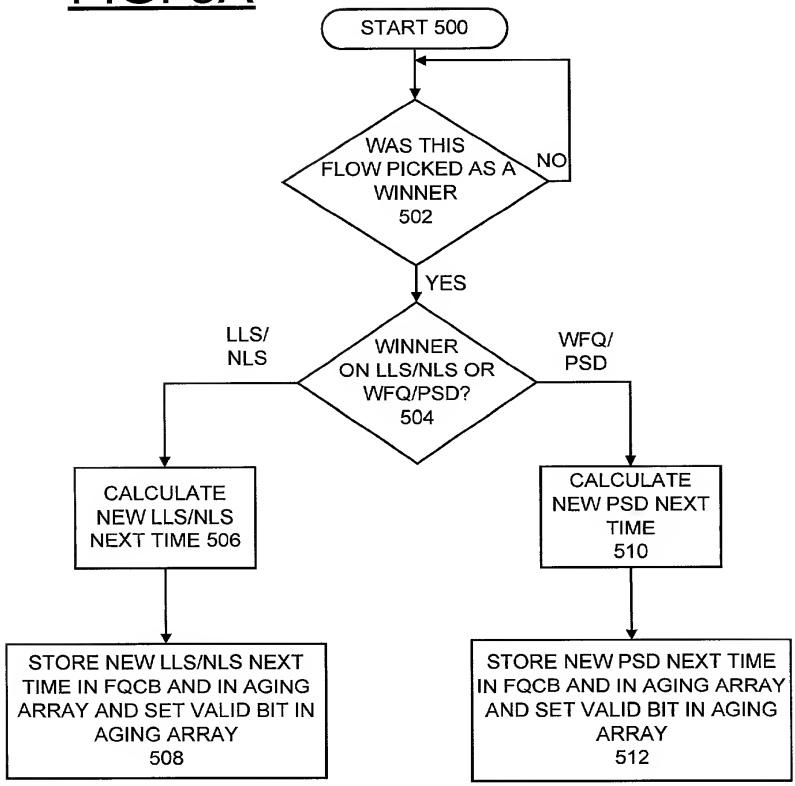
START 500
WAS THIS FLOW PICKED AS A WINNER 502
NO
YES
WINNER ON LLS/NLS OR WFQ/PSD? 504
LLS/ NLS
WFQ/ PSD
CALCULATE NEW LLS/NLS NEXT TIME 506
CALCULATE NEW PSD NEXT TIME 510
STORE NEW LLS/NLS NEXT TIME IN FQCB AND IN AGING ARRAY AND SET VALID BIT IN AGING ARRAY 508
STORE NEW PSD NEXT TIME IN FQCB AND IN AGING ARRAY AND SET VALID BIT IN AGING ARRAY 512

FIG. 5B

NEXT TIME 520 = (FRACTION 522)*(2**EXPONENT 524)

FRACTION 522 (15-BIT VALUE)
6-BIT EXTENSION 528 9-BIT BASE VALUE 526

EXPONENT 524 (3-BIT VALUE)

FIG. 5C

NEXT TIME ARRAY DATA 530

1 SELECTOR BIT 532
1 LLS/NLS NEXT TIME VALID BIT 534
1 PSD NEXT TIME VALID BIT 536
4 MSB OF NEXT TIME EXTENSION 528
3 NEXT TIME EXPONENT BITS 524
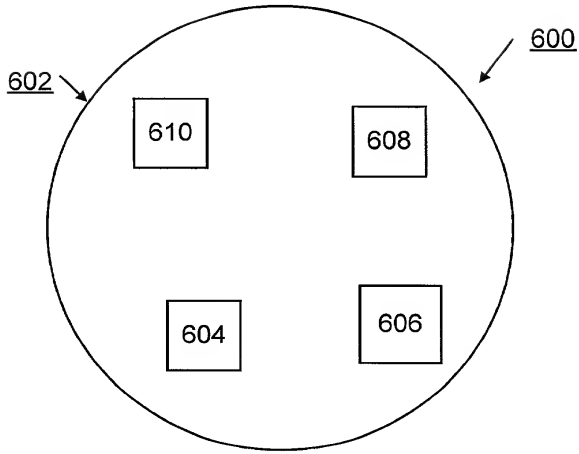
FIG. 6